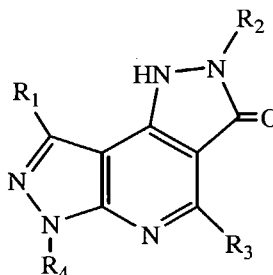


What is claimed is:

1. A compound of formula I



(I)

5 wherein

R_1 and R_4 are each independently H, C_1 - C_{10} alkyl optionally substituted with one or more halogen, hydroxy, C_1 - C_4 alkoxy, CO_2R_6 , $CONR_7R_8$, C_3 - C_7 cycloalkyl or optionally substituted phenyl groups, or

10 phenyl optionally substituted with one to three halogen, hydroxy, C_1 - C_6 haloalkyl, C_1 - C_4 alkoxy, CO_2R_9 , $NR_{10}R_{11}$ or CN groups;

R_2 is H, C_1 - C_6 alkyl optionally substituted with a phenyl, naphthyl or heteroaryl group each group optionally substituted with one to three C_1 - C_6 alkyl, C_1 - C_6 haloalkyl, C_1 - C_4 alkoxy, hydroxy, CHO, NO_2 , CN, CO_2R_{12} or $NR_{13}R_{14}$ groups,

15 phenyl optionally substituted with one to three halogen, NO_2 , CN, hydroxy, C_1 - C_6 alkyl, C_1 - C_6 haloalkyl, C_1 - C_6 alkoxy, phenyl, phenoxy, benzyl, benzyloxy, CO_2R_{17} , $NR_{18}R_{19}$ or $CH_2CO_2R_{20}$ groups,

naphthyl optionally substituted with one to three halogen, NO_2 , CN, hydroxy, C_1 - C_6 alkyl, C_1 - C_6 haloalkyl, C_1 - C_6 alkoxy, phenyl, phenoxy, benzyl, benzyloxy, CO_2R_{17} , $NR_{18}R_{19}$ or $CH_2CO_2R_{20}$ groups,

20 C_5 - C_7 cycloheteroalkyl optionally substituted with one to three halogen, NO_2 , CN, C_1 - C_6 alkyl, C_1 - C_6 haloalkyl, C_1 - C_4 alkoxy, CO_2R_{17} or $NR_{18}R_{19}$ groups, or

25 heteroaryl optionally substituted with one to three halogen, NO_2 , CN, C_1 - C_6 alkyl, C_1 - C_6 haloalkyl, C_1 - C_4 alkoxy, CO_2R_{17} or $NR_{18}R_{19}$ groups;

R₃ is phenyl optionally substituted with one to three halogen, NO₂, CN, hydroxy, C₁-C₆alkyl, C₁-C₆alkylthio, C₁-C₆haloalkyl, C₁-C₆alkoxy, phenyl, phenoxy, benzyl, benzyloxy, SO_nR₂₆, SO₂NR₂₁R₂₂, CO₂R₂₃ or NR₂₄R₂₅ groups,

5 cycloheteroalkyl optionally substituted with one or more halogen, NO₂, CN, hydroxy, C₁-C₆alkyl, C₁-C₆alkylthio, C₁-C₆haloalkyl, C₁-C₆alkoxy, phenyl, phenoxy, benzyl, benzyloxy, SO_nR₂₆, SO₂NR₂₁R₂₂, CO₂R₂₃ or NR₂₄R₂₅ groups, or

10 heteroaryl optionally substituted with one or more halogen, NO₂, CN, hydroxy, C₁-C₆alkyl, C₁-C₆alkylthio, C₁-C₆haloalkyl, C₁-C₆alkoxy, phenyl, phenoxy, benzyl, benzyloxy, SO_nR₂₆, SO₂NR₂₁R₂₂, CO₂R₂₃ or NR₂₄R₂₅ groups;

R₆, R₉, R₁₂, R₁₇, R₂₀ and R₂₆ are each independently H or a C₁-C₆alkyl, C₃-C₇cycloalkyl, C₁-C₆haloalkyl, phenyl, C₅-C₇cycloheteroalkyl or heteroaryl group each optionally substituted;

n is 0 or an integer of 1 or 2; and

R₇, R₈, R₁₀, R₁₁, R₁₃, R₁₄, R₁₈, R₁₉, R₂₁, R₂₂, R₂₄ and R₂₅ are each independently H or a C₁-C₆alkyl, C₃-C₇cycloalkyl, C₁-C₆haloalkyl, phenyl, C₅-C₇cycloheteroalkyl or heteroaryl group each optionally substituted or each of R₇ and R₈ or R₁₀ and R₁₁ or R₁₃ and R₁₄ or R₁₈ and R₁₉ or R₂₁ and R₂₂ or R₂₄ and R₂₅ may be taken together with the nitrogen atom to which they are attached to form a 5- to 7-membered ring optionally containing another heteroatom selected from O, N or S; or

the stereoisomers thereof or the pharmaceutically acceptable salts thereof.

25 2. The compound according to claim 1 wherein R₂ is an optionally substituted phenyl or heteroaryl group.

3. The compound according to claim 1 wherein R₁ is H, C₁-C₃alkyl or an optionally substituted benzyl group.

30 4. The compound according to claim 1 wherein R₃ is a C₅-C₇cycloheteroalkyl, heteroaryl or phenyl group each optionally substituted with one or two halogen, CN, NO₂, CF₃, methoxy, carboxy or SOR₂₆ groups.

5. The compound according to claim 2 wherein R_4 is H or phenyl or C_1 - C_4 alkyl optionally substituted with one hydroxy or phenyl group.

6. The compound according to claim 2 wherein R_3 is a thienyl, pyridyl or phenyl group, each optionally substituted with one or two halogen, CN, NO_2 , CF_3 , methoxy, carboxy or $SOCH_3$ groups.

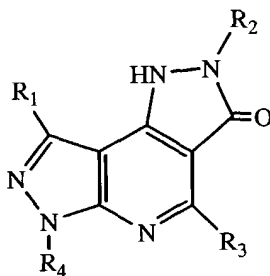
7. The compound according to claim 3 wherein R_2 is a phenyl group substituted with one or two halogen.

8. The compound according to claim 7 wherein R_3 is a phenyl group substituted with one NO_2 or CF_3 group.

9. The compound according to claim 8 wherein R_1 is H and R_4 is H or CH_3 .

10. A method for the treatment of an immune disorder related to or affected by the immune regulatory protein B7-1 which comprises providing a patient in need thereof an immunotherapeutically effective amount of a compound of formula

I



(I)

wherein

R_1 and R_4 are each independently H, C_1 - C_{10} alkyl optionally substituted with one or more halogen, hydroxy, C_1 - C_4 alkoxy, CO_2R_6 , $CONR_7R_8$, C_3 - C_7 cycloalkyl or optionally substituted phenyl groups, or phenyl optionally substituted with one to three halogen, hydroxy, C_1 - C_6 haloalkyl, C_1 - C_4 alkoxy, CO_2R_9 , $NR_{10}R_{11}$ or CN groups;

- R_2 is H, C_1 - C_6 alkyl optionally substituted with a phenyl, naphthyl or heteroaryl group each group optionally substituted with one to three C_1 - C_6 alkyl, C_1 - C_6 haloalkyl, C_1 - C_4 alkoxy, hydroxy, CHO, NO_2 , CN, CO_2R_{12} or $NR_{13}R_{14}$ groups,
- 5 phenyl optionally substituted with one to three halogen, NO_2 , CN, hydroxy, C_1 - C_6 alkyl, C_1 - C_6 haloalkyl, C_1 - C_6 alkoxy, phenyl, phenoxy, benzyl, benzyloxy, CO_2R_{17} , $NR_{18}R_{19}$ or $CH_2CO_2R_{20}$ groups, naphthyl optionally substituted with one to three halogen, NO_2 , CN, hydroxy, C_1 - C_6 alkyl, C_1 - C_6 haloalkyl, C_1 - C_6 alkoxy, phenyl, phenoxy, benzyl, benzyloxy, CO_2R_{17} , $NR_{18}R_{19}$ or $CH_2CO_2R_{20}$ groups,
- 10 C_5 - C_7 cycloheteroalkyl optionally substituted with one to three halogen, NO_2 , CN, C_1 - C_6 alkyl, C_1 - C_6 haloalkyl, C_1 - C_4 alkoxy, CO_2R_{17} or $NR_{18}R_{19}$ groups, or heteroaryl optionally substituted with one to three halogen, NO_2 , CN, C_1 - C_6 alkyl, C_1 - C_6 haloalkyl, C_1 - C_4 alkoxy, CO_2R_{17} or $NR_{18}R_{19}$ groups;
- 15 R_3 is phenyl optionally substituted with one to three halogen, NO_2 , CN, hydroxy, C_1 - C_6 alkyl, C_1 - C_6 alkylthio, C_1 - C_6 haloalkyl, C_1 - C_6 alkoxy, phenyl, phenoxy, benzyl, benzyloxy, SO_nR_{26} , $SO_2NR_{21}R_{22}$, CO_2R_{23} or $NR_{24}R_{25}$ groups,
- 20 cycloheteroalkyl optionally substituted with one or more halogen, NO_2 , CN, hydroxy, C_1 - C_6 alkyl, C_1 - C_6 alkylthio, C_1 - C_6 haloalkyl, C_1 - C_6 alkoxy, phenyl, phenoxy, benzyl, benzyloxy, SO_nR_{26} , $SO_2NR_{21}R_{22}$, CO_2R_{23} or $NR_{24}R_{25}$ groups, or heteroaryl optionally substituted with one or more halogen, NO_2 , CN, hydroxy, C_1 - C_6 alkyl, C_1 - C_6 alkylthio, C_1 - C_6 haloalkyl, C_1 - C_6 alkoxy, phenyl, phenoxy, benzyl, benzyloxy, SO_nR_{26} , $SO_2NR_{21}R_{22}$, CO_2R_{23} or $NR_{24}R_{25}$ groups;
- 25 R_6 , R_9 , R_{12} , R_{17} , R_{20} and R_{26} are each independently H or a C_1 - C_6 alkyl, C_3 - C_7 cycloalkyl, C_1 - C_6 haloalkyl, phenyl, C_5 - C_7 cycloheteroalkyl or heteroaryl group each optionally substituted;
- 30 n is 0 or an integer of 1 or 2; and R_7 , R_8 , R_{10} , R_{11} , R_{13} , R_{14} , R_{18} , R_{19} , R_{21} , R_{22} , R_{24} and R_{25} are each independently H or a C_1 - C_6 alkyl, C_3 - C_7 cycloalkyl, C_1 - C_6 haloalkyl, phenyl,

5 C₅-C₇cycloheteroalkyl or heteroaryl group each optionally substituted or each of R₇ and R₈ or R₁₀ and R₁₁ or R₁₃ and R₁₄ or R₁₈ and R₁₉ or R₂₁ and R₂₂ or R₂₄ and R₂₅ may be taken together with the nitrogen atom to which they are attached to form a 5- to 7-membered ring optionally containing another heteroatom selected from O, N or S; or
the stereoisomers thereof or the pharmaceutically acceptable salts thereof.

11. The method according to claim 10 wherein said disorder is transplant rejection.

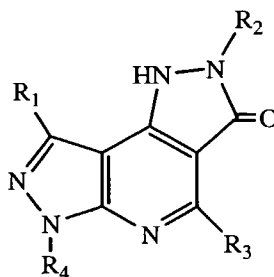
10 12. The method according to claim 10 wherein said disorder is an autoimmune disease.

13. The method according to claim 10 wherein said disorder is graft vs. host disease.

14. The method according to claim 12 wherein said disease is multiple sclerosis or rheumatoid arthritis.

15

15. A pharmaceutical composition which comprises a pharmaceutically acceptable carrier and an effective amount of a compound of formula I



(I)

wherein

20 R₁ and R₄ are each independently H, C₁-C₁₀alkyl optionally substituted with one or more halogen, hydroxy, C₁-C₄alkoxy, CO₂R₆, CONR₇R₈, C₃-C₇cycloalkyl or optionally substituted phenyl groups, or

- phenyl optionally substituted with one to three halogen, hydroxy, C₁-C₆haloalkyl, C₁-C₄alkoxy, CO₂R₉, NR₁₀R₁₁ or CN groups;
- R₂ is H, C₁-C₆alkyl optionally substituted with a phenyl, naphthyl or heteroaryl group each group optionally substituted with one to three C₁-C₆alkyl, C₁-C₆haloalkyl, C₁-C₄alkoxy, hydroxy, CHO, NO₂, CN, CO₂R₁₂ or NR₁₃R₁₄ groups,
- phenyl optionally substituted with one to three halogen, NO₂, CN, hydroxy, C₁-C₆alkyl, C₁-C₆haloalkyl, C₁-C₆alkoxy, phenyl, phenoxy, benzyl, benzyloxy, CO₂R₁₇, NR₁₈R₁₉ or CH₂CO₂R₂₀ groups,
- naphthyl optionally substituted with one to three halogen, NO₂, CN, hydroxy, C₁-C₆alkyl, C₁-C₆haloalkyl, C₁-C₆alkoxy, phenyl, phenoxy, benzyl, benzyloxy, CO₂R₁₇, NR₁₈R₁₉ or CH₂CO₂R₂₀ groups,
- C₅-C₇cycloheteroalkyl optionally substituted with one to three halogen, NO₂, CN, C₁-C₆alkyl, C₁-C₆haloalkyl, C₁-C₄alkoxy, CO₂R₁₇ or NR₁₈R₁₉ groups, or
- heteroaryl optionally substituted with one to three halogen, NO₂, CN, C₁-C₆alkyl, C₁-C₆haloalkyl, C₁-C₄alkoxy, CO₂R₁₇ or NR₁₈R₁₉ groups;
- R₃ is phenyl optionally substituted with one to three halogen, NO₂, CN, hydroxy, C₁-C₆alkyl, C₁-C₆alkylthio, C₁-C₆haloalkyl, C₁-C₆alkoxy, phenyl, phenoxy, benzyl, benzyloxy, SO_nR₂₆, SO₂NR₂₁R₂₂, CO₂R₂₃ or NR₂₄R₂₅ groups,
- cycloheteroalkyl optionally substituted with one or more halogen, NO₂, CN, hydroxy, C₁-C₆alkyl, C₁-C₆alkylthio, C₁-C₆haloalkyl, C₁-C₆alkoxy, phenyl, phenoxy, benzyl, benzyloxy, SO_nR₂₆, SO₂NR₂₁R₂₂, CO₂R₂₃ or NR₂₄R₂₅ groups, or
- heteroaryl optionally substituted with one or more halogen, NO₂, CN, hydroxy, C₁-C₆alkyl, C₁-C₆alkylthio, C₁-C₆haloalkyl, C₁-C₆alkoxy, phenyl, phenoxy, benzyl, benzyloxy, SO_nR₂₆, SO₂NR₂₁R₂₂, CO₂R₂₃ or NR₂₄R₂₅ groups;
- R₆, R₉, R₁₂, R₁₇, R₂₀ and R₂₆ are each independently H or a C₁-C₆alkyl, C₃-C₇cycloalkyl, C₁-C₆haloalkyl, phenyl, C₅-C₇cycloheteroalkyl or heteroaryl group each optionally substituted;
- n is 0 or an integer of 1 or 2; and

5 $R_7, R_8, R_{10}, R_{11}, R_{13}, R_{14}, R_{18}, R_{19}, R_{21}, R_{22}, R_{24}$ and R_{25} are each
 independently H or a C_1 - C_6 alkyl, C_3 - C_7 cycloalkyl, C_1 - C_6 haloalkyl, phenyl,
 C_5 - C_7 cycloheteroalkyl or heteroaryl group each optionally substituted or
 each of R_7 and R_8 or R_{10} and R_{11} or R_{13} and R_{14} or R_{18} and R_{19} or R_{21} and
 R_{22} or R_{24} and R_{25} may be taken together with the nitrogen atom to which
 they are attached to form a 5- to 7-membered ring optionally containing
 another heteroatom selected from O, N or S; or
 the stereoisomers thereof or the pharmaceutically acceptable salts thereof.

10 16. The composition according to claim 15 having a formula I compound
 wherein R_2 is an optionally substituted phenyl, thienyl or pyridyl group.

17. The composition according to claim 16 having a formula I compound
 wherein R_1 is H and R_4 is H or CH_3 .

15 18. The composition according to claim 17 having a formula I compound
 wherein R_3 is a thienyl, pyridyl or phenyl group each optionally substituted with one or
 two halogen, CN, NO_2 , CF_3 , methoxy, carboxy or $SOCH_3$ groups.

19. The composition according to claim 18 having a formula I compound
 wherein R_2 is a phenyl group substituted with one or two halogen.

20. The composition according to claim 15 having a formula I compound
 selected from the group consisting of:
 20 2-(3-fluorophenyl)-4-(3-nitrophenyl)-1,6-dihydrodipyrzolo[3,4-b:3',4'-d]pyridin-3(2H)-
 one;
 2-(3-fluorophenyl)-6-methyl-4-(3-nitrophenyl)-1,6-dihydrodipyrzolo[3,4-b:3',4'-d]-
 pyridin-3(2H)-one;
 2-(4-chlorophenyl)-6-methyl-4-[3-(trifluoromethyl)phenyl]-1,6-dihydrodipyrzolo-
 25 [3,4-b:3',4'-d]pyridin-3(2H)-one;
 2-(4-chlorophenyl)-6-methyl-4-(3-fluorophenyl)-1,6-dihydrodipyrzolo-
 [3,4-b:3',4'-d]pyridin-3(2H)-one;
 4-(5-bromo-3-pyridinyl)-6-methyl-3-[(trifluoromethyl)phenyl]-1,6-dihydrodipyrzolo-
 [3,4-b:3',4'-d]pyridin-3(2H)-one;
 30 4-(5-bromo-3-pyridinyl)-3-(4-fluorophenyl)-6-methyl-1,6-dihydrodipyrzolo-

- [3,4-b:3',4'-d]pyridin-3-(2H)-one;
 methyl 3-{6-methyl-3-oxo-4-[3-(trifluoromethyl)phenyl]-3,6-dihydrodipyrzolo-
 [3,4-b:3',4'-d]pyridin-2(1H)-yl}benzoate;
 2-chloro-5-{6-methyl-3-oxo-4-[3-(trifluoromethyl)phenyl]-3,6-dihydrodipyrzolo-
 5 [3,4-b:3',4'-d]pyridin-2(1H)-yl}benzoic acid;
 4-(3-bromophenyl)-6-methyl-2-(4-nitrophenyl)-1,6-dihydrodipyrzolo[3,4-b:3',4'-d]-
 pyridin-3(2H)-one;
 4-[4-(3-bromophenyl)-6-methyl-3-oxo-3,6-dihydrodipyrzolo[3,4-b:3',4'-d]pyridin-2(1H)-
 yl]-2-chlorobenzoic acid;
 10 methyl 2-fluoro-4-{6-methyl-3-oxo-4-[3-(trifluoromethyl)phenyl]-3,6-dihydrodipyrzolo-
 [3,4-b:3', 4'-d]pyridin-2-(1H)-yl}benzoate;
 the stereoisomers thereof;
 and the pharmaceutically acceptable salts thereof.